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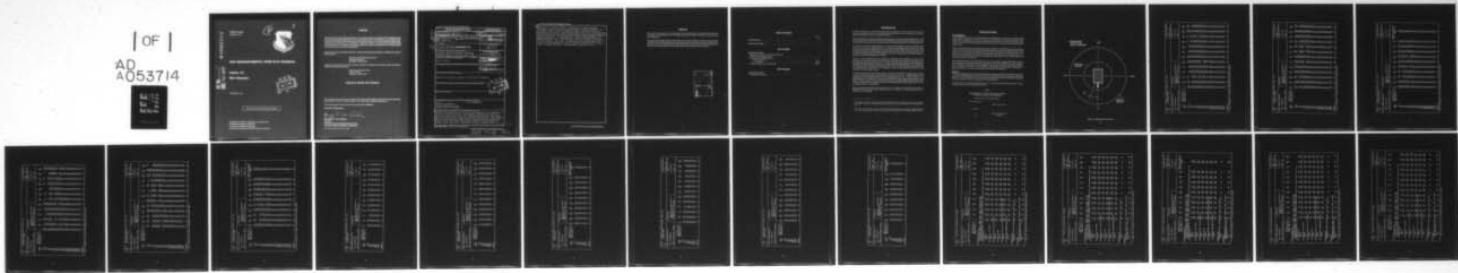
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Volume 118

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## USAF BIOENVIRONMENTAL NOISE DATA HANDBOOK

Volume 118

MD-4 Generator

DECEMBER 1977



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AEROSPACE MEDICAL RESEARCH LABORATORY  
AEROSPACE MEDICAL DIVISION  
AIR FORCE SYSTEMS COMMAND  
WRIGHT-PATTERSON AIR FORCE BASE, OHIO 45433

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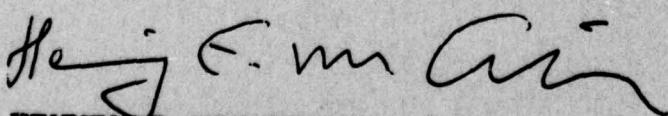
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FOR THE COMMANDER



HENNING E. VON GIERKE

Director

Biodynamics and Bioengineering Division  
Aerospace Medical Research Laboratory

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locations in a wide variety of physical and psychoacoustic measures: overall and band sound pressure levels, C-weighted and A-weighted sound levels, preferred speech interference level, perceived noise level, and limiting times for total daily exposure of personnel with and without standard Air Force ear protectors. Refer to Volume 1 of this handbook, "USAF Bioenvironmental Noise Data Handbook, Vol 1: Organization, Content and Application," AMRL-TR-75-50(1) 1975, for discussion of the objective and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc.

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## PREFACE

This report was prepared by the Biodynamic Environment Branch, Aerospace Medical Research Laboratory, under Project/Task 723-104, Measurement and Prediction of Noise Environments of Air Force Operations.

The author acknowledges the efforts of Mr. Robert G. Powell who assisted in collection of the noise data, and Mr. John N. Cole who established the data analysis requirements and assisted in the preparation of this report. Mr. Henry Mohlman and Mr. David Eilerman of the University of Dayton assisted in the mechanics of data processing, and Mrs. Peggy Massie typed and prepared the graphics.

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## INTRODUCTION

The MD-4 Generator is a motor-driven generator set designed to furnish alternating current for hangars, maintenance shops, and industrial facilities where precision bench mockup and test equipment requiring precise power are operated and tested.

This volume provides measured data defining the bioacoustic environments produced by this unit. Such data are essential to evaluate ear protection requirements, limiting personnel exposure times, voice communication capabilities, and annoyance problems associated with operations of the MD-4 generator.

This volume is one of a series published by the Aerospace Medical Research Laboratory (AMRL) under the same report number (AMRL-TR-75-50) as a multi-volume handbook that quantifies the noise environments produced at flight/ground crew locations and in surrounding communities by operations of Air Force aircraft and ground support equipment. The far-field, community-type, noise data in the handbook describe the noise produced during *ground operations* of aircraft, ground support equipment, and other ground-based equipment or facilities.

Volume 1 of this handbook discusses the objectives and design of the handbook, the types of data presented, measurement procedures, instrumentation, data processing, definitions of quantities, symbols, equations, applications, limitations, etc. Volume 2 provides a method and data for adjusting the handbook's far-field noise data, which are for standard meteorological conditions (15C temperature, 70% rel humidity, 0.760 meters Hg barometric pressure) to derive comparable data for other meteorological conditions. *Refer to Volumes 1 and 2* (references 1 and 2) for such information because it is not repeated in other handbook volumes.

A cumulative index lists those aerospace systems contained in the handbook, and identifies the specific volumes containing each type of environmental noise data available (i.e., inflight/flight crew and passenger noise, near-field/ground crew noise, far-field/community noise). Volume numbers are assigned sequentially as individual volumes are published. This index is periodically updated as individual volumes are published, and is available upon request from AMRL/BBE, Wright-Patterson AFB, OH 45433. Organizations on the distribution list for the handbook will automatically receive a copy of the updated index as it is generated.

Direct any questions concerning the technical data in this report and other handbook volumes to: AMRL/BBE, Wright-Patterson AFB, OH 45433; Autovon 78-53675 or 78-53664; Commercial (513) 255-3675 or (513) 255-3664.

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1. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 1: Organization, Content and Application*, AMRL-TR-75-50 (1), Aerospace Medical Research Laboratory, Wright-Patterson Air Force Base, Ohio, 1975.
  2. Cole, John N., *USAF Bioenvironmental Noise Data Handbook, Volume 2: Procedure to Evaluate Effects of Non-standard Meteorological Conditions on Far-Field Noise*, AMRL-TR-75-50 (2), AMRL, WPAFB, OH, 1975.

## NEAR-FIELD NOISE

### MEASUREMENTS

A standard MD-4 generator was operated inside, and approximately in the center of a large aircraft hangar (190.5 m long x 95.1 m wide x 18.3 m high) on a concrete floor at normal rated conditions. The hangar walls and ceiling were not acoustically treated. No aircraft were in the vicinity of the unit while being measured. No far-field acoustic data were acquired because of the relatively close proximity of the hangar walls.

Figure 1 identifies 36 noise measurement locations at a height of 1.5 meters above the concrete apron (nominal ear level of ground crew). The 0 degree reference direction passes through the tow bar. These locations are in the acoustic near-field of the source where the sound wave fronts generally do not spherically diverge and the source appears to be spatially distributed (i.e., not a point source). Consequently, these near-field data cannot be extrapolated to longer distances but do properly define the levels at locations close to the unit.

Near-field measurements were also made at ear level at the operator control panel. Table 1 lists the numeric/alphabetic designators used on the data pages in this report to identify the operator measurement location and test conditions. The designator 1/A means operator location 1 and test condition A. Such a descriptor is essential in many handbook volumes that involve multiple combinations of locations/conditions. It is used in this report to maintain format consistency.

### RESULTS

The measured data presented in Table 2 define the sound pressure levels (SPL) produced by the MD-4 unit at the 37 specified, near-field locations. This table includes the overall, 1/3 octave band, and octave band levels. From these data one can calculate the variety of measures in Table 3 which are widely used to assess the effects of noise on personnel and their performance.

For data at other intermediate near-field locations (i.e., for radial distances less than 4 meters) you can interpolate between the 36 measured data points.

TABLE 1  
MEASUREMENT LOCATION AND TEST CONDITION  
FOR OPERATOR NOISE MEASUREMENTS

MD-4 Generator, Edwards AFB, 10 May 77

*Measurement Location*

1

Operator Control Panel

*Operation*

A

Electrically loaded by 24T-8  
Unloaded

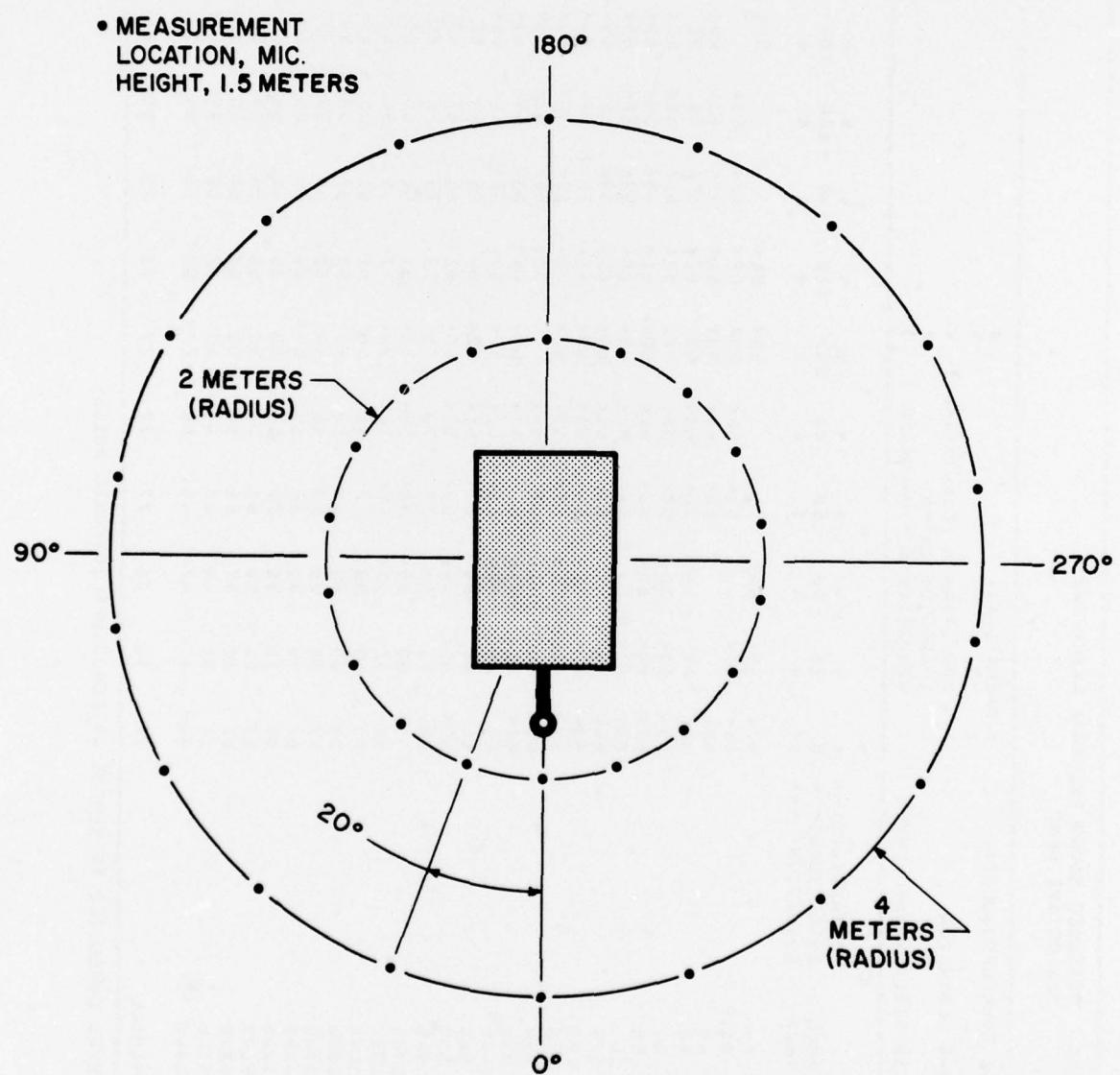


Figure 1. Measurement Locations

TABLE I MEASURED SOUND PRESSURE LEVEL (dB)  
1/3 OCTAVE BAND

MEASURED SOUND PRESSURE LEVEL (dB)										IDENTIFICATION	
1/3 OCTAVE BAND										TEST 77-005-001	
NOISE SOURCE/SUBJECT: 2. MD-4 GENERATOR										RUN 01	
NEAR FIELD NOISE LEVELS										10 MAY 77	
FREQ (HZ)										PAGE F1	
DISTANCE (M) ->										OPERATION	
ANGLE (DEG) ->										CONDITION A - ELECTRICALLY	
CONDITION ->										LOADED BY 24T-8	
CONDITION B - UNLOADED										CONDITION B - UNLOADED	
25	57<	55<	54<	4	4	4	4	4	4	57<	54<
31.5	68<	65<	65<	60<	64	64	60	64	66	63<	55<
40	62<	62<	62<	63<	66<	66<	62<	61<	61<	60<	64<
50	67<	69	69	69	66<	66<	62<	67<	70	71	64<
63	59<	60<	60<	60<	57<	56<	58<	58<	61<	60<	60<
80	61<	60<	60<	60<	64<	64<	62<	61<	59<	62<	63<
100	63<	63<	64<	64<	64<	64<	66<	66<	62<	67<	68<
125	65<	64<	64<	64<	68<	68<	65<	65<	63<	65<	65<
160	63<	62<	64<	64<	64<	66<	63<	63<	66<	64<	66<
200	62<	61<	61<	62<	62<	63<	62<	62<	62<	63<	64<
250	63<	61<	61<	62<	64<	64<	62<	60<	60<	63<	61<
315	62<	61<	61<	61<	62<	62<	64<	63<	64<	64<	63<
400	69	65<	64<	61<	62<	62<	64<	64<	62<	66<	66<
500	66	66	64<	62<	61<	61<	62<	64<	66<	66<	65<
630	60<	61<	59<	60<	59<	60<	61<	62<	63<	63<	64<
800	69	73	68	70	70	71	73	74	75	71	75
1000	59<	60	58<	58<	57<	58<	61	62	64	62	63<
1250	58<	57<	55<	56<	54<	54<	58<	57<	59	62	58<
1600	58	59	59	57	58	58	61	61	61	59	58
2000	56	56	55	54	53	55	58	57	59	59	58
2500	59	60	59	59	56	55	60	60	65	63	60
3150	63	64	61	60	60	59	64	65	66	67	61
4000	55	56	55	53	52	55	56	58	60	61	56
5000	57	61	56	61	56	60	59	66	63	60	61
6300	60	62	57	61	56	60	63	67	66	65	62
8000	51	51	49	48	48	47	52	53	55	55	53
10000	30<	30<	47<	46<	46<	47<	50<	52<	54	55	51<
OVERALL	77	78	76	77	77	78	79	80	78	80	79

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( TABLE 2 MEASURED SOUND PRESSURE LEVEL (dB) 1/3 OCTAVE BAND

NOISE SOURCE/SUBJECT:		OPERATION:		CONDITION A - ELECTRICALLY		CONDITION B - UNLOADED		DISTANCE (M) ->		4		4		2		2		2		2		2					
HD-4 GENERATOR		CONDITION		LOADED BY 24T-8		UNLOADED		25		58<		56<		59<		60<		60		80		100		120		140	
NEAR FIELD NOISE LEVELS		FREQ (HZ)		ANGLE (DEG) -->		A		A		A		A		A		A		A		A		A		A			
25	31.5	40	50	63	80	100	125	160	200	250	315	400	500	630	800	1000	1250	1600	2000	2500	3150	4000	5000	6300	8000	10000	
2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
77	79	78	79	81	83	81	81	80	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	79	

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE I MEASURED SOUND PRESSURE LEVEL (DB)  
2 1/3 OCTAVE BAND

NOISE SOURCE/SUBJECT:		OPERATION:		CONDITION A - ELECTRICALLY		CONDITION B - UNLOADED		OPERATOR LOCATION	
MD-4 GENERATOR		NEAR FIELD NOISE LEVELS		LOADED BY 24T-8		UNLOADED		TEST CONDITION	
FREQ (HZ)	ANGLE (DEG) -->	DISTANCE (M) -->	NEAR FIELD NOISE LEVELS	A	A	A	A	A	A
25	54<	56<	56<	50<	57<	61<	57<	58<	59<
31.5	64<	65<	64<	67<	66<	70<	67<	68<	69<
40	60	62<	60	65	65	67<	64<	67	69<
50	62<	67<	66<	67<	64<	70	66<	67	69<
63	59<	60<	61<	59<	60<	61<	58<	60<	63<
80	63<	63<	65	65	64	65	62<	63<	66
100	67<	67<	68<	67<	68<	69<	68<	68<	69<
125	66<	65<	67<	66<	66<	63<	65	65	67<
160	74	71	68<	69<	66<	65<	63<	64<	67<
200	66<	67<	66<	66<	63<	66<	66<	66<	68<
250	68<	70<	70<	68<	67<	66<	65<	67<	70<
315	68	68	69	68	66	66	67	64<	67
400	69	70	70	69	68	65<	66<	67	70
500	68	67	67	67	66	63<	65	66	68
630	67	66	69	67	65	64<	63	66	66
800	73	75	78	72	69	74	75	79	83
1000	69	67	66	66	62	61	62	64	71
1250	63	63	64	63	59	57<	59	59	69
1600	64	62	62	64	63	62	61	62	67
2000	63	64	63	64	61	60	57	57	61
2500	67	67	67	64	62	60	64	62	64
3150	68	67	73	69	64	62	61	64	73
4000	64	64	64	63	58	55	55	59	67
5000	69	69	68	67	63	64	57	61	75
6300	70	70	70	68	65	65	64	62	63
8000	58	59	59	57	53	51	52	53	63
10000	59	58	59	55	51<	49<	50<	52<	64
OVERALL	81	82	83	81	79	79	79	80	88

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE 2 MEASURED SOUND PRESSURE LEVEL (dB)

2

1/3 OCTAVE BAND

NOISE SOURCE/SUBJECT:		OPERATION:		CONDITION A - ELECTRICALLY		CONDITION B - UNLOADED		DISTANCE (M) ->		ANGLE (DEG) ->		FREQ (HZ)		NEAR FIELD NOISE LEVELS	
MD-4 GENERATOR		LOADED BY 24I-8		10 MAY 77		PAGE F4		TEST 77-005-001		RUN 04		OMEGA 3.2		IDENTIFICATION:	
25		64<		61<		54<		4		4		4		4	
31.5		68<		64<		66<		68<		62<		66<		62<	
40		62<		61<		63<		62<		61<		65<		53<	
50		69		66<		68		65<		56<		57<		53<	
63		63<		57<		61<		56<		57<		57<		59<	
80		63<		60<		59<		55<		58<		55<		58<	
100		65<		62<		61<		64<		62<		62<		61<	
125		65<		63<		68<		62<		64<		64<		63<	
160		66<		62<		64<		63<		61<		65<		60<	
200		69<		62<		61<		60<		61<		60<		59<	
250		62<		60<		60<		60<		62<		60<		61<	
315		61<		60<		60<		61<		61<		65<		63<	
400		66<		63<		61<		63<		62<		64<		63<	
500		64		64		60<		63<		62<		64<		64<	
630		61<		61<		59<		58<		61<		60<		59<	
800		67		72		72		73		75		66		74	
1000		58<		58<		57<		58<		60		59<		75	
1250		57<		57<		55<		54<		55<		50<		58<	
1600		57		59		57		58		60		62		60	
2000		56		55		53		56		58		57		58	
2500		59		59		58		57		57		59		61	
3150		61		61		60		60		64		63		64	
4000		56		55		51		56		56		57		58	
5000		61		60		58		54		63		61		62	
6300		61		61		58		55		64		64		62	
8000		54		50		48		48		51		52		51	
10000		51<		49<		48<		47<		46<		50<		54	
OVERALL		78		77		76		77		78		75		80	
* LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.															

\* LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.



TABLE I MEASURED SOUND PRESSURE LEVEL (dB)  
2 1/3 OCTAVE BAND

NOISE SOURCE/SUBJECT:		OPERATION:		IDENTIFICATION	
MD-4 GENERATOR		CONDITION A - ELECTRICALLY LOADED BY 24T-8		OMEGA 3.2 TEST 77-005-001	
NEAR FIELD NOISE LEVELS		CONDITION B - UNLOADED		RUN 06 10 MAY 77	
FRq (Hz)	ANGLE (DEG) CONDITION	DISTANCE (M) -->	OPERATION:	PAGE	F6
25	0	2	2	2	2
31.5	0	160	180	200	240
40	0	8	8	8	8
50	0	62<	57<	63<	57<
63	0	64<	63<	67<	69<
80	0	61<	59<	60<	60<
100	0	62<	62<	62<	62<
125	0	62<	61<	61<	61<
160	0	65<	66<	65<	66<
200	0	66<	67<	67<	67<
250	0	68<	68<	66<	66<
315	0	65<	66<	65<	65<
400	0	70	71	69	69
500	0	69	68	67	67
630	0	67	65	64	64
800	0	74	75	78	78
1000	0	68	66	64	64
1250	0	62	64	63	63
1600	0	63	65	65	65
2000	0	63	63	60	60
2500	0	67	68	65	65
3150	0	69	72	68	68
4000	0	64	63	62	62
5000	0	68	74	62	62
6300	0	72	71	65	65
8000	0	69	58	57	57
10000	0	59	57	54	54
OVERALL	0	81	82	81	80
				78	78
				81	81
				84	82
					89

< LEVEL CORRECTED TO REMOVE BACKGROUND/ELECTRONIC NOISE.

TABLE 2		MEASURED SOUND PRESSURE LEVEL (dB)										IDENTIFICATION:			
NOISE SOURCE/SUBJECT:		OPERATION:										TEST 77-005-001			
MD-4 GENERATOR		CONDITION A - ELECTRICALLY										RUN 01			
NEAR FIELD NOISE LEVELS		CONDITION B - UNLOADED										10 MAY 77			
FREQ (HZ)	ANGLE (DEG)--> CONDITION-->	4	4	4	4	4	4	4	4	4	4	4	4	4	4
31.5	A	69	66	66	66	69	70	68	67	65	62	61	66	65	65
63	A	68	70	69	67	69	70	69	68	71	71	73	75	71	71
125	A	69	68	67	71	70	70	69	69	70	69	70	72	71	71
250	A	67	66	66	66	67	65	68	66	67	68	69	69	68	68
500	A	71	69	68	66	66	66	68	70	71	70	69	68	69	69
1000	A	70	73	69	74	70	71	74	75	75	72	77	75	73	73
2000	A	63	63	63	62	61	61	64	64	67	62	65	64	65	65
4000	A	65	66	63	64	62	63	65	69	69	67	68	65	64	64
8000	A	61	62	58	62	57	60	63	67	66	66	65	64	63	63
OVERALL		77	78	76	77	77	77	78	79	80	78	80	80	79	79

TABLE 2		MEASURED SOUND PRESSURE LEVEL (DB)										IDENTIFICATION			
NOISE SOURCE/SUBJECT		OPERATION										TEST 77-005-001			
MD-4 GENERATOR		CONDITION A - ELECTRICALLY										RUN 02			
NEAR FIELD NOISE LEVELS		CONDITION B - UNLOADED										10 MAY 77			
FREQ (HZ)	ANGLE (DEG)	DISTANCE (M) ->	4	4	4	4	4	4	4	4	4	PAGE	J2		
		260	280	300	320	340	0	20	40	60	80	100	120	140	
		A	A	A	A	A	A	A	A	A	A	A	A	A	
31.5	63	67	68	67	70	70	68	65	66	67	68	68	68	66	
	125	71	73	66	66	69	71	68	68	68	69	69	70	69	
	250	69	71	70	71	71	73	71	69	69	70	71	71	73	
	500	67	67	68	69	70	73	75	74	72	72	71	70	72	
	1000	66	72	73	74	76	79	73	72	72	73	70	71	72	
	2000	62	62	63	65	69	66	67	66	66	66	64	65	67	
	4000	62	61	60	64	66	70	71	66	66	66	66	66	70	
	8000	59	57	57	61	63	66	68	63	64	65	66	66	68	
OVERALL		77	79	78	79	81	83	81	80	79	79	80	80	84	

TABLE I  
MEASURED SOUND PRESSURE LEVEL (DB)  
OCTAVE BAND  
2

NOISE SOURCE/SUBJECT:		OPERATION:		CONDITION A - ELECTRICALLY		CONDITION B - UNLOADED		TEST CONDITION		OPERATOR LOCATION	
MD-4 GENERATOR		CONDITION		LOADED BY 24T-8		UNLOADED		1/A		A	
NEAR FIELD NOISE LEVELS		DISTANCE (M) ->	ANGLE (DEG) ->	2	2	2	2	2	2	2	2
FREQ (HZ)	CONDITION	ANGLE (DEG) ->	DISTANCE (M) ->	160	180	200	220	240	260	280	300
31.5	A	A	A	65	67	65	58	69	72	69	71
63	A	A	A	66	69	69	68	71	68	69	69
125	A	A	A	73	73	73	72	70	71	69	71
250	A	A	A	72	73	73	72	70	71	70	72
500	A	A	A	73	73	73	73	71	68	70	72
1000	A	A	A	75	76	78	73	72	69	74	75
2000	A	A	A	70	70	69	68	67	64	66	66
4000	A	A	A	72	72	74	72	67	66	66	67
8000	A	A	A	71	70	71	69	65	65	61	63
OVERALL	A	A	A	81	82	83	81	79	79	80	82
											83
											88

TABLE I MEASURED SOUND PRESSURE LEVEL (DB)		IDENTIFICATION:									
2 OCTAVE BAND		TEST 77-005-001									
NOISE SOURCE/SUBJECT:		OPERATIONS:									
MD-4 GENERATOR		CONDITION A - ELECTRICALLY									
NEAR FIELD NOISE LEVELS		LOADED BY 24T <sup>-8</sup>									
NEAR FIELD NOISE LEVELS		CONDITION B - UNLOADED									
FREQ (HZ)	ANGLE (DEG) -->	4	4	4	4	4	4	4	4	4	4
31.5	0	70	66	68	60	80	100	120	140	160	180
63	63	70	67	69	66	63	66	58	59	60	64
125	125	70	67	66	70	69	68	64	67	67	66
250	250	68	64	64	65	67	64	68	66	66	65
500	500	69	70	67	66	60	67	67	68	70	69
1000	1000	68	72	66	72	73	75	67	79	75	76
2000	2000	62	62	63	61	61	63	64	65	67	65
4000	4000	64	65	63	65	61	63	66	70	69	68
8000	8000	62	61	59	64	56	59	64	66	65	64
OVERALL		78	77	76	76	77	78	75	80	78	78



TABLE I MEASURED SOUND PRESSURE LEVEL (DB)  
2 OCTAVE BAND

NOISE SOURCE/SUBJECT:		OPERATION:		CONDITION A - ELECTRICALLY		CONDITION B - UNLOADED		IDENTIFICATION:	
MD-4 GENERATOR		LOADED BY 24F-8		TEST 77-005-001		TEST 77-005-001		OMEGA 3.2	
NEAR FIELD NOISE LEVELS								RUN 06	
FREQ (HZ)	DISTANCE (M) ->	2	2	2	2	2	2	2	2
	ANGLE (DEG) ->	160	180	200	220	240	260	280	300
	CONDITION	B	B	B	B	B	B	B	340
31.5	6.8	64	65	69	67	70	69	70	73
63	66	62	63	66	64	65	62	63	67
125	72	73	71	70	68	68	65	69	72
250	71	72	71	70	69	69	69	69	72
500	73	73	73	71	71	68	69	71	74
1000	75	76	77	76	77	72	74	73	79
2000	70	70	70	68	67	63	65	67	82
4000	72	73	74	69	68	66	68	67	84
8000	73	71	72	66	63	64	65	63	75
OVERALL		81	81	82	81	80	78	81	82
									89

TABLE I MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT*		OPERATION*		CONDITION A - ELECTRICALLY		CONDITION B - UNLOADED		EXPOSURE PER DAY (AFR 161-35, JULY 73)	
MD-4 GENERATOR		24-8		10 MAY 77		PAGE H1			
NEAR FIELD NOISE LEVELS		A		A		A			
DISTANCE (M) -->	4	4	4	4	4	4	4	4	4
ANGLE (DEG) -->	20	40	60	80	100	120	140	160	200
CONDITION-->	A	A	A	A	A	A	A	A	A
HAZARD/PROTECTION									
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DBC) AT EAR									
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR									
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)									
NO PROTECTION		77		75		70		77	
OASLC		73		75		72		75	
OASLA		900		960		960		960	
T		900		960		960		960	
MINIMUM QPL EAR MUFFS		53		52		52		53	
OASLA*		960		960		960		960	
T		960		960		960		960	
AMERICAN OPTICAL 1700 EAR MUFFS		48		47		47		47	
OASLA*		960		960		960		960	
T		960		960		960		960	
V-51R EAR PLUGS		49		51		48		49	
OASLA*		960		960		960		960	
T		960		960		960		960	
AMERICAN OPTICAL 1700 EAR MUFFS PLUS		35		37		33		34	
OASLA*		960		960		960		960	
T		960		960		960		960	
H-133 GROUND COMMUNICATION UNIT		46		47		45		46	
OASLA*		960		960		960		960	
T		960		960		960		960	
COMMUNICATION PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)									
PSIL		68		66		66		69	
ANNOUNCE PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)									
TONE CORRECTION (C IN DB)		91		88		89		92	
PNLT		90		93		93		94	
C		3		4		4		4	
* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.									

\* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE I MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT:		OPERATION:		IDENTIFICATION:	
MD-4 GENERATOR		CONDITION A - ELECTRICALLY		OMFGA 3.2	
NEAR FIELD NOISE LEVELS		LOADED BY 24T-8		TEST 77-005-001	
CONDITION B - UNLOADED		10 MAY 77		RUN 02	
		PAGE H2		10 MAY 77	
DISTANCE (M) -->		4	4	2	2
ANGLE (DEG) -->		260	300	340	380
CONDITION-->		A	A	A	A
HAZARD/PROTECTION					
C-WEIGHTED OVERALL SOUND LEVEL (OASLG IN DBC) AT EAR					
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DBA) AT EAR					
MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)					
NO PROTECTION					
OASLC		77	78	83	88
OASLA		71	74	78	82
T		960	960	960	960
MINIMUM QPL EAR MUFFS					
OASLA*		54	53	56	58
T		960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS		49	49	52	55
OASLA*		960	960	960	960
T					
V-51R EAR PLUGS					
OASLA*		47	50	54	57
T		960	960	960	960
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS		34	37	41	43
OASLA*		960	960	960	960
T					
H-133 GROUND COMMUNICATION UNIT		45	47	51	53
OASLA*		960	960	960	960
T					
COMMUNICATION					
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)					
PSIL		65	67	71	74
ANNOYANCE					
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)					
TONE CORRECTION (C IN DB)					
PNLT		d7	90	94	97
C		2	4	4	5
				3	4
					5

\* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE I MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT:		OPERATION:		IDENTIFICATION:	
MD-4 GENERATOR		CONDITION A - ELECTRICALLY		OMEGA 3.2	
NEAR FIELD NOISE LEVELS		LOADED BY 24I-8		TEST 77-005-001	
NEAR FIELD NOISE LEVELS		CONDITION B - UNLOADED		RUN 03	
DISTANCE (M) ->	2	2	2	2	2
ANGLE (DEG) ->	160	180	200	220	240
CONDITION ->	A	A	A	A	A
HAZARD/PROTECTION	C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR	MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)			
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR		NO PROTECTION			
OASLC	81	81	82	80	79
OASLA	79	79	81	78	76
T MINIMUM QPL EAR MUFFS	960	960	807	960	960
OASLA*	56	57	57	56	54
AMERICAN OPTICAL 1700 EAR MUFFS	960	960	960	960	960
OASLA*	51	52	52	51	49
V-51R EAR PLUGS	960	960	960	960	960
OASLA*	54	54	56	53	51
AMERICAN OPTICAL 1760 EAR MUFFS PLUS V-51R EAR PLUGS	960	960	960	960	960
OASLA*	44	41	42	39	37
H-133 GROUND COMMUNICATION UNIT	960	960	960	960	960
OASLA*	51	52	54	51	48
COMMUNICATION	PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)	ANNOYANCE			
PSIL	72	73	74	71	70
ANNOYANCE	PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDdB)	TONE CORRECTION (C IN DB)			
PNLT	95	96	96	94	92
C	2	3	3	2	3

\* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.



TABLE 3: MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT		( OPERATION: )		) IDENTIFICATION: )			
( MU-4 GENERATOR		( CONDITION A - ELECTRICALLY )		) OMEGA 3.2 )			
( CONDITION B - LOADED BY 24 <sup>-8</sup>			) TEST 77-005-001 )				
( NEAR FIELD NOISE LEVELS			) RUN 05 )				
) 10 MAY 77 )		) PAGE H5 )		) 10 MAY 77 )			
DISTANCE (M) -->	4	4	4	2	2		
ANGLE (DEG) -->	26 <sup>u</sup>	28 <sup>u</sup>	34 <sup>u</sup>	32 <sup>u</sup>	34 <sup>u</sup>		
CONDITION-->	d	B	B	B	B		
HAZARD/PROTECTION							
C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR							
A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR							
MAXIMUM PERMISSIBLE TIME (IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)							
NO PROTECTION							
OASLC	74	75	78	80	83		
OASLA	72	72	75	78	81		
T	960	960	960	960	960		
MINIMUM QPL EAR MUFFS	50	50	52	53	57		
OASLA*	960	960	960	960	960		
AMERICAN OPTICAL 1700 EAR MUFFS	44	44	40	47	47		
OASLA*	960	960	960	960	960		
V-51K EAR PLUGS	46	49	53	52	51		
OASLA*	960	960	960	960	960		
AMERICAN OPTICAL 1700 EAR MUFFS PLUGS	33	35	39	38	41		
OASLA*	960	960	960	960	960		
H-133 GROUND COMMUNICATION UNIT	43	45	48	51	53		
OASLA*	960	960	960	960	960		
COMMUNICATION							
PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)	63	66	68	70	74		
PSIL							
ANNOYANCE							
PERCEIVED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDB)							
TONE CORRECTION (C IN DB)	68	88	91	91	94		
PNLT	3	5	5	5	5		
C							

\* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.

TABLE 3 MEASURES OF HUMAN NOISE EXPOSURE

3

NOISE SOURCE/SUBJECT		OPERATION		CONDITION A - ELECTRICALLY		CONDITION B - UNLOADED		NEAR FIELD NOISE LEVELS		IDENTIFICATION	
MD-4 GENERATOR		TEST 77-005-001		OMEGA 302		TEST 77-005-001		RUN 06		TEST 77-005-001	
NEAR FIELD NOISE LEVELS		10 MAY 77		PAGE H6		PAGE H6		PAGE H6		PAGE H6	
DISTANCE (M) -->		2	2	2	2	2	2	2	2	2	2
ANGLE (DEG) -->		160	160	200	220	240	260	280	300	320	340
CONDITION --->		B	B	B	B	B	B	B	B	B	TEST CONDITION
HAZARD/PROTECTION		C-WEIGHTED OVERALL SOUND LEVEL (OASLC IN DB) AT EAR A-WEIGHTED OVERALL SOUND LEVEL (OASLA IN DB) AT EAR MAXIMUM PERMISSIBLE TIME (T IN MINUTES) FOR ONE EXPOSURE PER DAY (AFR 161-35, JULY 73)									
NO PROTECTION		81	81	82	81	80	77	78	81	84	82
OASLC		80	80	81	80	78	74	76	79	82	80
OASLA		960	960	807	960	960	960	960	960	960	960
T											285
MINIMUM VPL EAR MUFFS		5b	57	56	55	54	52	52	55	57	57
OASLC*		960	960	960	960	960	960	960	960	960	960
T											65
AMERICAN OPTICAL 1700 EAR MUFFS		51	51	50	49	48	47	46	49	51	51
OASLA*		960	960	960	960	960	960	960	960	960	960
T											960
V-51R EAR PLUGS		54	54	55	56	54	50	52	56	59	56
OASLC*		960	960	960	960	960	960	960	960	960	960
T											62
AMERICAN OPTICAL 1700 EAR MUFFS PLUS V-51R EAR PLUGS		40	40	42	42	40	36	38	42	45	48
OASLA*		960	960	960	960	960	960	960	960	960	960
T											960
H-133 GROUND COMMUNICATION UNIT		52	52	54	52	51	47	48	52	54	52
OASLA*		960	960	960	960	960	960	960	960	960	960
T											960
COMMUNICATION		PREFERRED SPEECH INTERFERENCE LEVEL (PSIL IN DB)									
PSIL		73	73	73	73	72	68	69	72	74	73
ANNOYANCE		PREFERRED NOISE LEVEL, TONE CORRECTED (PNLT IN PNDDB)									
TONE CORRECTION (C IN DB)		96	96	98	96	94	90	92	95	98	95
PNLT		2	3	4	5	4	3	4	5	5	4
C											4

\* BASED ON CALCULATED SPL SPECTRUM UNDER PROTECTIVE DEVICE.